

# Some new results on domination roots of a graph

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## ABSTRACT

Let  $G$  be a simple graph of order  $n$ . The domination polynomial of  $G$  is the polynomial  $D(G, \lambda) = \sum_{i=0}^n d(G, i) \lambda^i$ , where  $d(G, i)$  is the number of dominating sets of  $G$  of size  $i$ . Every root of  $D(G, \lambda)$  is called the domination root of  $G$ . We present families of graphs whose their domination polynomial have no nonzero real roots. We observe that these graphs have complex domination roots with positive real part. Then, we consider the lexicographic product of two graphs and obtain a formula for domination polynomial of this product. Using this product, we construct a family of graphs which their domination roots are dense in all of  $\mathbb{C}$ .

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